Dec. 15, 1925. 1,565,558

J. A. FREMON

PIN TUMBLER LOCK

Filed Jan. 23, 1922

Fig. 1.

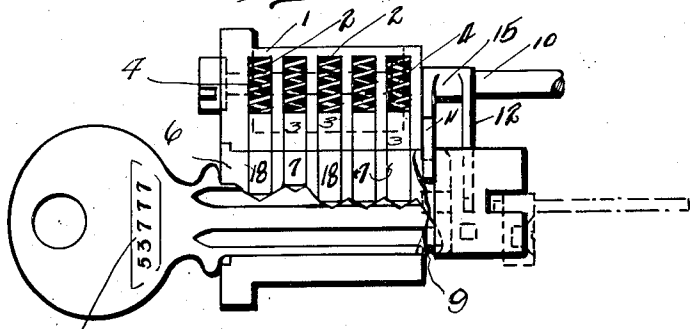


Fig. 2.

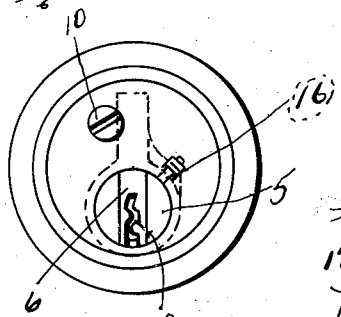


Fig. 4

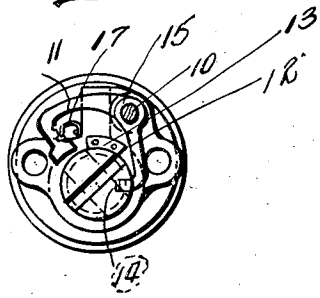


Fig 3

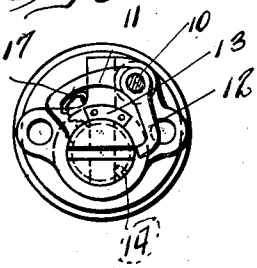


Fig. 5.

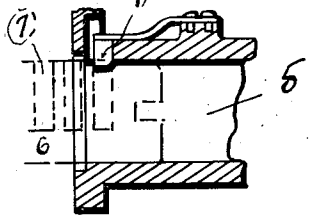


Fig. 7.

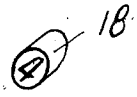


Fig. 6.

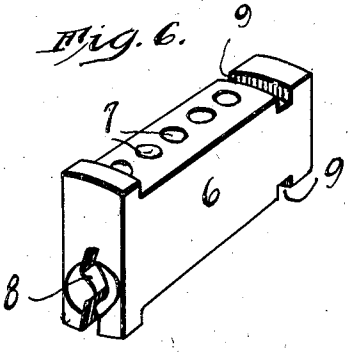


Fig. 8.

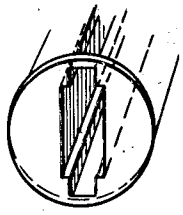
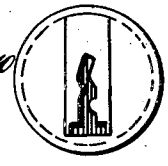


Fig. 9.



Fig. 10



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UNITED STATES PATENT OFFICE.

JULES A. FREMON, OF LEEPER, MISSOURI.

PIN-TUMBLER LOCK.

Application filed January 23, 1922. Serial No. 531,215.

To all whom it may concern:

Be it known that I, JULES A. FREMON, a citizen of the United States, residing at Leeper, Wayne County, Missouri, have invented a certain new and useful Improvement in Pin-Tumbler Locks, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this application.

Pin tumbler locks are now supplied to the retail trade so that each lock responds to a different key. They are only furnished in matchet sets (several responding to the same key) or in master keyed sets by special order to the factory. Only by special order may one obtain pin tumbler locks of different types, such as door locks, padlocks, desk locks, etc., to be operated by the same key or provided with a master key.

The combination of a pin tumbler lock may be changed by changing the pin tumblers. This may be effected by merely shifting the pins provided in the lock as well as by substituting new pins. The only requirement to make special locks just mentioned for which factory orders are necessary is that the pin tumblers must be arranged in the desired lengths. It is possible to secure the same results without resort to factory by disassembling stock locks and reassembling the same with the pins changed and arranged as desired. It is not practical to do this except the job be done by experienced locksmith and only by him at considerable expense because of the time involved, as present standard lock construction is only adapted to be assembled by experienced workmen with special equipment.

A key-operated lock fails when it responds to other than the key of its owner or a key the use of which is authorized by him. When it responds to an unauthorized key, it fails doubly. It does not afford protection and it makes the owner more likely to suffer loss by reason of his fancied security. It is evident, therefore, that a lock in perfect physical condition may at the same time be wholly worthless for its intended use by reason of the existence of duplicate keys, but it may be restored to proper functioning condition by changing its pin tumblers.

Pin tumbler locks, however, as at present constructed, are generally abandoned and replaced under such circumstances, because to make the extremely simple change necessary, the lock must be completely disassembled at an expenditure of time and money equal to or greater than the cost of a new lock.

The object of my invention is to provide in a form adapted for present standards, a lock or lock portion which readily permits the changing of its combination without undue expense or special experience and at any time during the life of the lock.

In the accompanying drawings which illustrate a selected embodiment of my invention and modifications thereof,—

Figure 1 is a vertical longitudinal section through a pin tumbler lock provided with my improvements.

Figure 2 is a front view of the lock.

Figure 3 is a rear view of the lock, in normal condition.

Figure 4 is a rear view in key-changing position.

Figures 5, 6 and 7 are detail views.

Figures 8 and 9 illustrate a modified form of rotatable plug.

Figure 10 illustrates another modification of plug construction.

The driver case 1 is of the usual shape and is provided with ordinary driver recesses 2 in which are the usual drivers 3 and their springs 4. The cylindrical rotating plug 5 is slotted lengthwise almost its entire length to receive a rectangular block 6 which fills the slot, the edge of the block forming a continuation of the periphery of the plug.

Block 6 is provided with pin tumbler recesses 7 and with a longitudinal key-receiving slot 8. The form and relation of recesses 7 and slot 8 are the same as in the usual lock but as is obvious, that portion of the lock containing these elements may be pulled out of the plug, and the pins therein readily removed and changed as desired.

To regulate the removal of block 6 from the plug and to prevent its removability from interfering with the normal operation of the lock are the functions of the following elements. At the rear of the plug and the block is a common peripheral groove 9. Journaled in case 1 is a rod 10 which fixedly mounts a rigid member 15 having a latch portion 11 and a finger portion 12. The

end of the latch portion is adapted normally to be seated in groove 9 and to form an extension of a groove engaging element 13 fixed on the case. Latch 11 and element 13 prevent longitudinal movement of the plug or of the block, while the groove in the latter is engaged by element 13. When the plug is rotated so that the groove 9 in block 6 is no longer engaged by element 13 or latch 11, then the block may be withdrawn. Latch 11 will be held positively in the position shown in Figure 3 by the contact of the end of finger 12 with the ungrooved periphery of the plug. It will also be held yieldingly in this position by a spring 17.

When the proper key is inserted in recess 8 and the plug with the block turned to the position shown in Figure 4, the grooved portion of block 6 will be aligned with latch 11, and a recess 14 in the plug will be aligned with the end of finger 12, and when the plug is in this position, rod 10 may be rotated, turning member 15 so that latch 11 moves out of the groove 9 and finger 12 moves into recess 14, as shown in Figure 4. Member 15 is yieldingly held in this position by spring 17. When in this position, the outer ends of the pins seated in block recesses 7 are held against further projection by the interior periphery of the case and withdrawal of the key will pull block 6 out of the plug. Such withdrawal will have no effect upon the drivers 3 in case 1 as the entrances into the driver recesses 2 are closed by the periphery of the plug.

The key may then be removed and a differently bitted key inserted and one or more of the pins 18 removed and replaced by others of sufficient length to bring their ends flush with the edge of the block. The block with the new key inserted is then pushed into the plug and member 15 turned by means of rod 10 to its original position, permitting rotation of the plug and preventing longitudinal movement of the plug or block.

To prevent insertion of block 6 with pins of insufficient length in recesses 7 is the function of a yielding stop 16 (Figure 5) which rides upon the edge of block 6 and will project into any recess 7 which is not completely filled by a pin tumbler. Of course, if any of the pins are too long and extend beyond the edge of the block, they will engage the front of the case and prevent further movement of the block inwardly. In order to prevent interference with the removal of the block after being checked by stop 16 as just described, the rear of the stop is rounded as shown so that it will ride over the material between the recesses when the block is pulled outwardly. Stop 16 should be located somewhat in advance of the first pin recess so that the first pin will have to pass by the stop when the block is inserted.

As is well known to those skilled in the art, the pin tumblers 18 are made in standard lengths, each a multiple of a given unit. The key for each lock has stamped upon it the numbers of the units making up each of the pins for which that key is bitted. For example: In the key illustrated, the number 53777 shown at 19 indicates that the corresponding pin tumblers from the handle of the key outward are 5, 3, 7, 7, and 7 units in length, respectively.

With the assembling of the pins in the blocks by other than locksmiths, as contemplated by me, it is desirable that the different pins bear some mark which will facilitate their use. Consequently I prefer to stamp indicia of the length of the pins upon one end of each, as illustrated in Figure 7. An owner desiring to change a lock so that it will be operated by a different key, will remove the pin block, withdraw the key, insert the new key, dump the pins which are then too short or too long, and replace them from the forward end of the block rearwardly according to the numbers stamped on the new key, readily selecting such pins by the numbers stamped on their ends.

The mounting of member 15 on a rod which extends to the front of the lock as illustrated in the accompanying drawings, facilitates the substitution of the case and plug shown for a case and plug in the locks now on the market, or in use, as this substitution could be made without in any way interfering with the remainder of the lock.

In the manufacture of a new lock containing my improved equipment, it would perhaps be desirable to have member 15 operated from the inner side of the door or other article to which it is applied, and I have accordingly shown the inner end of rod 10 as projecting inwardly beyond member 15 for this purpose, it being understood that in such case the extended bearing in case 1 and the projection at the front of the case would be eliminated.

In the construction shown in Figures 8 and 9, the plug and block are so shaped that they fit together more snugly and the front of the plug has a shouldered portion forming a complete circle which stiffens the plug at the cut-away portion.

In the construction shown in Figure 10, the bottom of the key instead of having a sliding bearing upon the inner periphery of the case is raised from the latter and will not be worn by friction with the case. This elminates a certain amount of looseness in the fitting of the key which has been necessary hitherto and a binding of the plug in the case due to the wear of the key.

The form of construction of a pin-tumber

lock designed by me affords the following advantages:

With an ordinary line of "stock" locks, the retail dealer may furnish a lock for a given key which now may be had only from the factory or by expensive locksmithing. This service may be rendered by any dealer without materially disassembling the locks.

Such "special" locks may be furnished without any extra expense, so the purchaser may readily obtain matched sets of locks for his dwelling, office, garage, etc. Also padlocks and other types of pin-tumbler locks may be matched with door locks and with each other.

Any locks added to the number already in use and under the control of an individual may be furnished by the retail dealer to respond to the key theretofore used by the owner. This is desirable from the standpoint of the manufacturer or dealer, for the reason that having installed one lock of this construction, there will be a strong incentive to purchase all future locks of the same construction, so that those added may be matched with the ones already in use.

After being put into service, if the lock "fails" by reason of the undesirable existence of duplicate keys, or if for any reason a new or different lock is desired, the desired end is attained in a manner nearly as simple as a safety razor blade is replaced, by merely withdrawing the pin-block and fitting either the present set of pins or a new set to correspond to a different key. This is accomplished without removing the lock from its mounting and without inconveniently disassembling the lock. It may be done by any person by the aid of very simple instructions and the only expense is the cost of the new key.

When furnished with a changeable-bit key in which the bitting may be arranged as desired, changes may be made in the combination of the lock as often as desired, and without any expense whatever. If a number of locks are master keyed, either the individual keys or the master key may be changed without effecting the complementary key.

It should be remembered that in speaking of "changing" the combination, any and every kind of combination to which a pin-tumbler lock may conform is meant. For instance, a "straight" lock may be converted into a master-keyed lock. Two "straight" locks, that is, locks which respond to different keys, may be changed so that both will respond to the same key, and also, if desired, may be still operated by their original keys separately. In short, any possible arrangement that may be had now in a practical manner by dealing directly with the factory, may be attained by the service of the lock dealer directly over the counter.

These advantages are obtained without changes in the size or shape of the case or plug; consequently a case and plug of this construction may be applied to locks now in service.

I claim:

1. In a pin tumbler lock, a rotatable plug, and a longitudinally removable block in said plug provided with pin tumbler recesses.

2. In a pin tumbler lock, a rotatable plug, and a removable block therein, one edge of which block forms a continuation of the periphery of said plug.

3. In a pin tumbler lock, a rotatable plug longitudinally slotted, and a removable pin tumbler block fitting in said slot and completing the plug periphery.

4. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable longitudinally from said plug, and means for retaining said block in said plug except when said plug is in a predetermined angular relation to said case.

5. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable longitudinally from said plug, means for retaining said block in said plug except when said plug is in a predetermined angular relation to said case, and means for preventing rotation of said plug when said block is removed.

6. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable longitudinally from said plug, and means for retaining said block in said plug, except when said plug is in a predetermined angular relation to said case, and adapted to be manipulated manually to release said block when said plug is in said predetermined position.

7. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable longitudinally from said plug, and means for retaining said block in said plug when the recesses in said block are aligned with the drivers in said case.

8. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable longitudinally from said plug, means for retaining said block in said plug when the recesses in said block are aligned with the drivers in said case, and means for preventing rotation of said plug in said case when said block is removed from said plug.

9. In a pin tumbler lock, a rotatable plug, a longitudinally removable block in said plug provided with pin tumbler recesses and a key slot.

10. In a pin tumbler lock, a rotatable plug, a longitudinally extending block in said plug provided with pin tumbler recesses and a key slot and removable from said plug when the latter is turned to a predetermined position by a key in said slot.

11. In a pin tumbler lock, a case, a plug rotatable therein, a block slidable longitudinally of said plug, having an edge forming a continuation of the plug periphery and having a peripheral groove forming a continuation of a similar groove in the plug, groove engaging means on said case to prevent longitudinal movement of said block, and a movable latch forming a portion of said means to permit longitudinal movement of said block when rotated so that its grooved portion is opposite to said latch when said latch is retracted.

12. In a pin tumbler lock, a case, a plug rotatable therein, a block slidable longitudinally of said plug, having an edge forming a continuation of the plug periphery and having a peripheral groove forming a continuation of a similar groove in the plug, groove engaging means on said case to prevent longitudinal movement of said block, a movable latch forming a portion of said means to permit longitudinal movement of said block when rotated so that its grooved portion is opposite to said latch when said latch is retracted, and a finger engaging said plug, when said latch is retracted, to prevent rotation of said plug.

13. In a pin tumbler lock, a driver case, a removable rotatable member provided with recesses adapted to receive drivers from said case to be engaged against rotation, pins in said recesses adapted, when a key is inserted in a lock, to be raised with their ends flush with the periphery of said member, and a stop adapted to project into any of said recesses unfilled by said pins when said member is inserted in said case to prevent assembly of said case and member unless said recesses are completely filled by said pins.

14. In a pin tumbler lock. a rotatable plug, a member rotatable therewith, and longitudinally removable therefrom, an element having two positions, one in which it prevents removal of said member from said plug and the other in which it prevents rotation of said plug, and means for yieldingly holding said element in either of said positions.

15. In a pin tumbler lock, a rotatable plug, a member rotatable therewith and removable therefrom, an element movable to different positions by one having access to the rear of the lock in one of which positions said element prevents removal of said member from said plug and in the other of which positions it prevents rotation of said plug.

16. In a pin tumbler lock, a rotatable plug and a block in said plug provided with pin tumbler recesses and removable from said plug without removing the latter from the lock.

17. In a pin tumbler lock, a driver case, a plug rotatable therein, a block removable from said plug, and means for retaining said block in said plug except when said plug is in a predetermined angular relation to said case.

18. In a pin tumbler lock, a driver case, a a plug rotatable therein, a block removable from said plug, means for retaining said block in said plug except when said plug is in a predetermined angular relation to said case, and means for preventing rotation of said plug when said block is removed.

19. In a pin tumbler lock, a rotatable plug, and a removable block in said plug provided with a key slot.

In testimony whereof I hereunto affix my signature this 18th day of January 1922.

JULES A. FREMON.